

Fossil Red-shouldered Hawk in the Bahamas: *Calohierax quadratus* Wetmore synonymized with *Buteo lineatus* (Gmelin)

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Abstract.—A supposedly extinct genus and species of hawk, *Calohierax quadratus* Wetmore, was originally described from a fragmentary tarsometatarsus from Quaternary deposits in Little Exuma Island in the Bahamas. This and a referred tibiotarsus from New Providence, Island, were later assigned to the extant genus *Buteo*, but their specific identity remained uncertain. A previously unstudied humerus from a cave deposit on New Providence Island, Bahamas, is here identified with the extant Red-shouldered Hawk, *Buteo lineatus* Gmelin, a species widespread in eastern North America and common in peninsular Florida but unknown in the Bahamas. The other fossils are assigned to this species as well. *Calohierax quadratus* therefore becomes a synonym of *Buteo lineatus*, which species has retreated from the Bahamas in the late Quaternary for reasons that are unclear.

Among the several new species of birds that were described by Wetmore (1937) from Quaternary cave deposits on Little Exuma Island, Bahamas, was a new genus and species of hawk, *Calohierax quadratus*, based on the distal end of a tarsometatarsus. The site was not on Great Exuma as Wetmore originally reported (see Olson and Pregill 1982:3). Brodkorb (1959) later referred the distal end of a tibiotarsus from a cave deposit on New Providence Island, Bahamas, to the same species. Restudy of these specimens showed that the supposed characters of the genus *Calohierax* were founded entirely on artifacts of wear in the case of the holotype, or intrageneric variation in the case of the referred specimen (Olson & Hilgartner 1982). The specimens were otherwise considered to be too fragmentary for specific identification, falling within the range of size variation of the living Red-shouldered Hawk *Buteo lineatus* (Gmelin) or Gray Hawk *B. nitidus* (Latham).

Under present geographical and climatic conditions, the Red-shouldered Hawk,

which occurs through most of eastern North America and is abundant in Florida, would be considered a more likely candidate for having occurred in the Bahamas. The Neotropical Gray Hawk now occurs only as far north and east as Arizona and Texas. Nevertheless, there is ample precedent for various Neotropical and western vertebrates having occurred in eastern North America, particularly Florida, in the Pleistocene (Emslie, 1998), so the possibility of *Buteo nitidus* possibly having once occurred in the Bahamas is not unthinkable.

The Bahaman fossil hawk was thus listed simply as "*Buteo* sp.", with the genus *Calohierax* Wetmore falling into the synonymy of *Buteo* Lacepede, 1799 (Olson & Hilgartner 1982). The idea that there was an extinct hawk in the Bahamas has lingered, however, and *Calohierax quadratus* has even appeared, in a reference that I can no longer recall, under the absurd name "Quadrate Hawk." Wetmore's specific name "*quadratus*", it should be noted, was derived from the squared appearance of one of the tarsometatarsal trochleae, a feature

that turned out to be only an artifact of wear (Olson & Hilgartner 1982).

Because of the ambiguities surrounding the records of a medium-sized species of *Buteo* in the Bahamas, it is fortunate that an additional specimen bearing on its identity was located in the collections of the Florida Museum of Natural History. This is a nearly complete right humerus (UF 41801), lacking only a portion of the pectoral crest. It was collected by J. C. Dickinson and W. Auffenberg in the same "Banana Hole" on New Providence Island that yielded the fossils that formed the basis of Brodkorb's (1959) study and much of that of Olson & Hilgartner (1982). It was collected in 1958–1960, evidently after Brodkorb's study was completed, and since its collection has apparently been overlooked.

The fossil humerus is in all details and proportions identical with that in *Buteo lineatus* (Fig. 1) and in size falls squarely among males from Florida (Fig. 2), which belong to the southeastern subspecies *B. l. alleni* Ridgway, which is smaller than the nominate subspecies (Crocoll 1994). From the small sample of *Buteo nitidus* examined, it is clear not only that *B. nitidus* is a smaller species, with females in the range of males of *B. lineatus* in length of the humerus and the single male being much smaller (Fig. 2), but the humerus is also much more robust, the shaft especially being much thicker. Assuming that there was only one species of *Buteo* in the Bahamas in this size range, then the holotypical tarsometatarsus of *Calohierax quadratus* from Little Exuma would belong to the same species as the humerus from New Providence, both islands being on the Great Bahama Bank. Therefore the species *Calohierax quadratus* Wetmore, 1937, becomes a junior subjective synonym of *Falco lineatus* Gmelin, 1788.

The Red-shouldered Hawk is normally a bird of moist riparian woods or swamplands, hardly like the dry, scrubby habitats that predominate in the Bahamas today. Brown and Amadon (1968:578) remark that

this species "seems to be incompatible with" the larger Red-tailed Hawk, *B. jaamaicensis* (Gmelin), although this is as much a reflection of the preference of the latter for drier uplands rather than being due to competition or antipathy. In any case, it is the Red-tailed Hawk that occurs in the Bahamas today, although it is an uncommon resident only on some of the larger northern islands and may perhaps be a recent colonist, as it is absent in the fossil record.

Prior to the arrival of Europeans only a single terrestrial mammal lived in the Bahamas, the hutia *Geocapromys ingrahami* (Allen), which is now extinct on all but a single small islet. The adults of this species are too large to have served as prey for Red-shouldered Hawks, but because these hawks are very catholic in their choice of food, taking birds, reptiles, amphibians, large insects, and even crustaceans in addition to mammals (Crocoll 1994), and because all of these faunal elements are still present in the Bahamas, it would be difficult to correlate the extinction of *Buteo lineatus* there to lack of suitable prey.

Habitat in most places in the Bahamas is not now like that usually considered suitable for Red-shouldered Hawks, but is thought to have been even more xeric in the past (Pregill & Olson 1981, Olson & Hilgartner 1982). Thus, environmental and climatic changes are also difficult to invoke as an explanation for the disappearance of this species from the Bahamas in the late Quaternary.

The Bahaman fossil records constitute the only evidence of *Buteo lineatus* anywhere in the West Indies, although *B. ridgwayi* of Hispaniola is now usually considered to be a derivative of *B. lineatus* (e.g., Sibley & Monroe 1990), so the Bahamas may once have provided a stepping-stone for this colonization.

Acknowledgments

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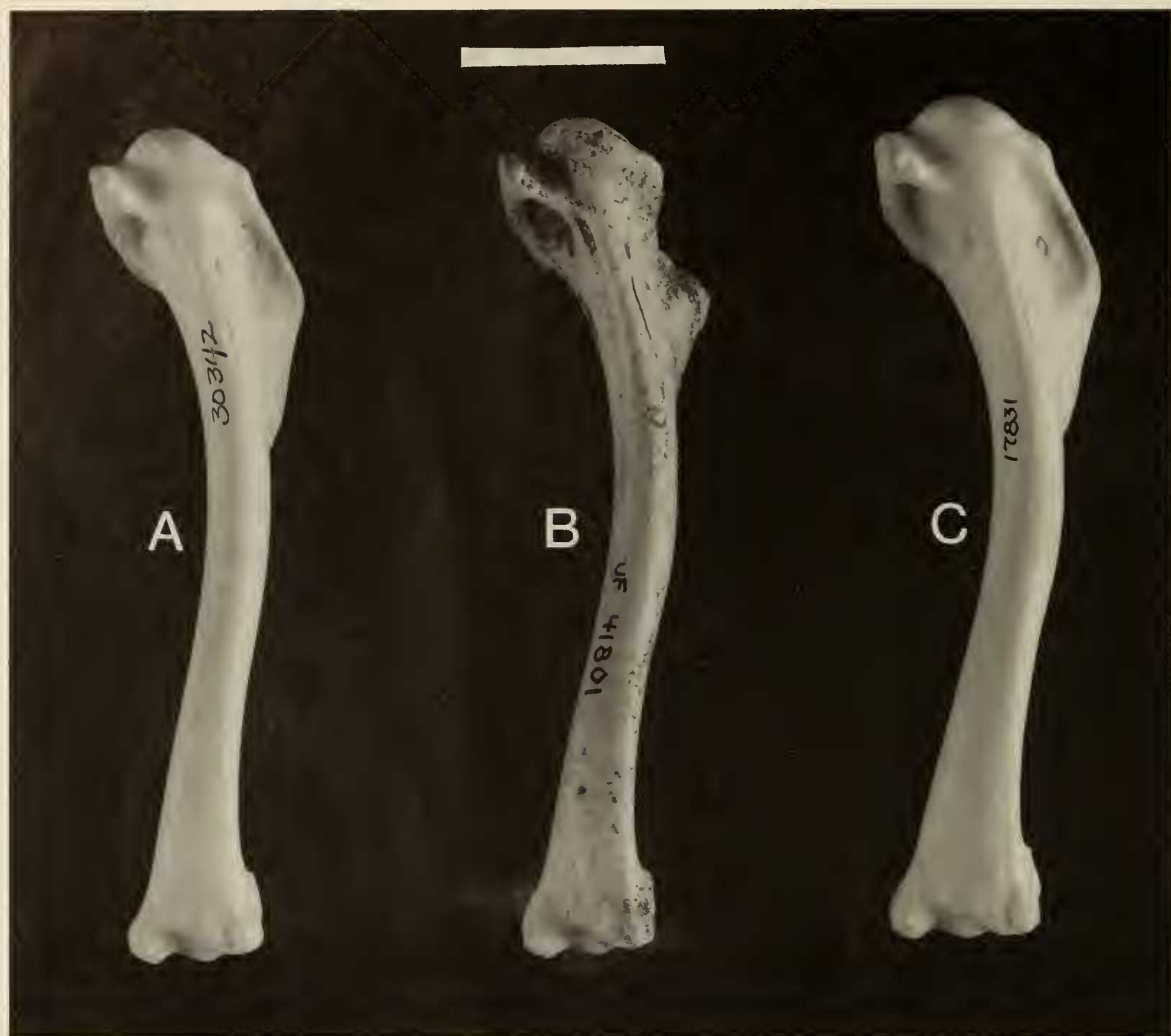


Fig. 1. Right humeri of *Buteo* in anconal aspect: A, male Red-shouldered Hawk, *B. lineatus*, (UF 23893); B, fossil referred to *B. lineatus* from New Providence Island, Bahamas (UF 41801); C, female Gray Hawk, *B. nitidus* (UF 33746). Scale bar = 2 cm.

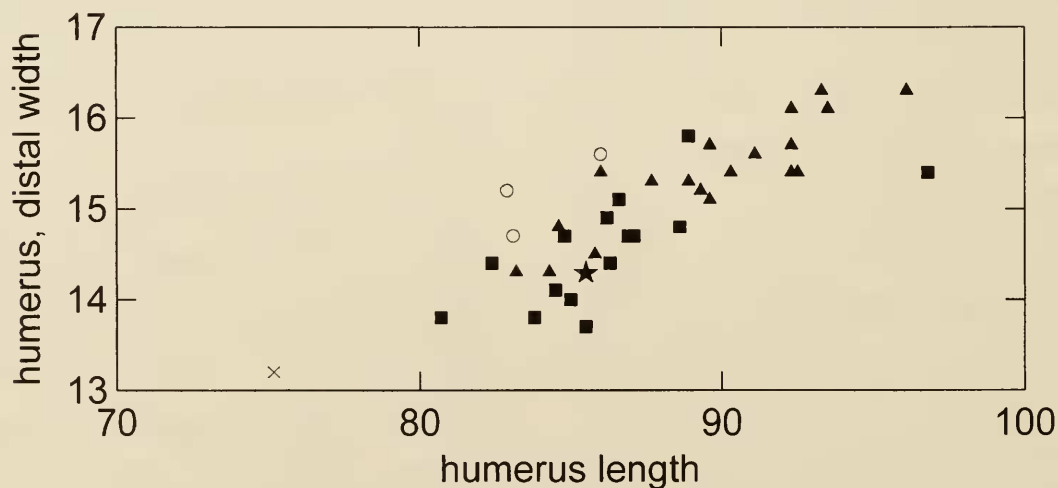


Fig. 2. Scatter diagram showing length of humerus vs. distal width of humerus in male *Buteo lineatus* (squares), female *B. lineatus* (triangles), the Bahaman fossil assigned to *B. lineatus* (star), female *B. nitidus* (circles), and male *B. nitidus* (X). Five obviously missexed specimens have been corrected. All specimens of *B. lineatus* are from Florida and are in the collections of the Florida Museum of Natural History.

Gainesville, for access to and loan of specimens that made this study possible: David W. Steadman and Tom Webber for modern birds, and Marc Frank for the fossils. The photograph is by John Steiner, Smithsonian Photographic Services, and Fig. 2 was prepared by Helen James.

Literature Cited

- Brodkorb, P. 1959. Pleistocene birds from New Providence Island, Bahamas.—*Bulletin of the Florida State Museum, Biological Sciences* 4(11): 349–371.
- Brown, L., & D. Amadon. 1968. Eagles, hawks, and falcons of the world. 2 vols. McGraw Hill, New York, 945 pp.
- Crocoll, S. T. 1994. Red-shouldered Hawk *Buteo lineatus*.—*Birds of North America* 107:1–19.
- Emslie, S. D. 1998. Avian community, climate, and sea-level changes in the Plio-Pleistocene of the Florida Peninsula.—*Ornithological Monographs* 50:1–113.
- Olson, S. L., & W. B. Hilgartner. 1982. Fossil and subfossil birds from the Bahamas. Pp. 22–56 in S. L. Olson, ed. *Fossil vertebrates from the Bahamas*.—*Smithsonian Contributions to Paleobiology* 48.
- , & G. K. Pregill. 1982. Introduction to the paleontology of Bahaman vertebrates. Pp. 1–7 in S. L. Olson, ed., *Fossil vertebrates from the Bahamas*.—*Smithsonian Contributions to Paleobiology* 48.
- Pregill, G. K., & S. L. Olson. 1981. Zoogeography of West Indian vertebrates in relation to Pleistocene climatic cycles.—*Annual Review of Ecology and Systematics* 12:75–98.
- Sibley, C. G., & B. L. Monroe, Jr. 1990. *Distribution and taxonomy of birds of the world*. Yale University Press, New Haven, 1111 pp.
- Wetmore, A. 1937. Bird remains from cave deposits on Great Exuma Island in the Bahamas.—*Bulletin of the Museum of Comparative Zoology* 80:427–441.